VALLEY WEATHER WIND

Spring 2010

National Weather Service
Omaha/Valley, Nebraska

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A Newsletter for Emergency Managers, Core Storm Spotters, Media, and Public Officials in Eastern Nebraska and Southwest Iowa

Comments and suggestions are always welcome. Your feedback is very important to us!

Please contact us by telephone, e-mail, or regular mail.

National Weather Service
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This publication also is available on-line at **http://www.crh.noaa.gov/oax/news/newsletter.pdf**

Chief Editor:

Barbara Mayes

A Winter to Remember

by Rick Chermok and Barbara Mayes, Meteorologists

The winter of 2009-2010 was one for the record books, with significant snow amounts early in the season as well as very cold temperatures. The winter ended with a warm March, but not before setting records for snow fall and duration of snow on the ground. A few of the notable rankings for Omaha, Lincoln, and Norfolk are listed in the table below.

Rankings for Winter of 2009-2010 Compared to Records

	Omaha	Lincoln	Norfolk
Snowfall, Annual	14th - 47.6"	8th - 41.6"	6th - 55.0"
Snowfall, Dec-Jan-Feb	2nd - 43.1"	1st - 38.8"	1st - 50.5"
Duration, Snow Depth 1"+	1st - 88 days	2nd - 85 days	7th - 89 days
Duration, Snow Depth 12"+	1st - 25 days	1st - 22 days	4th - 24 days
Precipitation, Dec-Jan-Feb	10th - 4.10"	14th - 4.23"	10th - 3.71"
Average Temp., Dec-Jan-Feb	11th - 19.2"	8th - 20.0"	8th - 17.7"

December of 2009 was the snowiest December on record at all three sites. Omaha had its second snowiest December through February period on record, as well as the longest snow cover duration on record for depths from 1” to 12” and more. Lincoln had its snowiest December through February on record, and the duration of snow cover on the ground set a record at 12” depth and was among the tops for other depths. Norfolk also had its snowiest December through February season on record. Temperatures were among the top 10 to 15 coldest in both December and through the winter at all three sites.

Inside This Issue . . .

Blowing snow and cold temperatures following the snow paved the way for this sundog near the NWS office after the Dec. 7-9 storm (photograph by Rick Chermok).

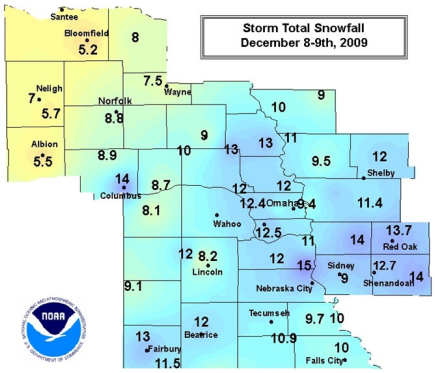
A Winter to Remember, cont'd

(Continued from page 1)

A Recap of the Blizzards and Winter Storms that hit Eastern Nebraska and Southwest Iowa Over a 30-Day Period from December 2009 into January 2010

The first storm to hit the area: December 7-9, 2009

A large and relatively slow-moving storm brought a prolonged winter storm and even, for a short time, blizzard conditions to most of eastern Nebraska and western Iowa from late on the 7th through the early morning hours of the 9th. The heaviest snow fell in advance of when the stronger winds arrived, mainly during the morning and afternoon of the 8th. However, as north winds increased to 30 to 50 mph during the night of the 8th and early on the 9th, visibilities intermittently dropped to near zero, especially in open areas.



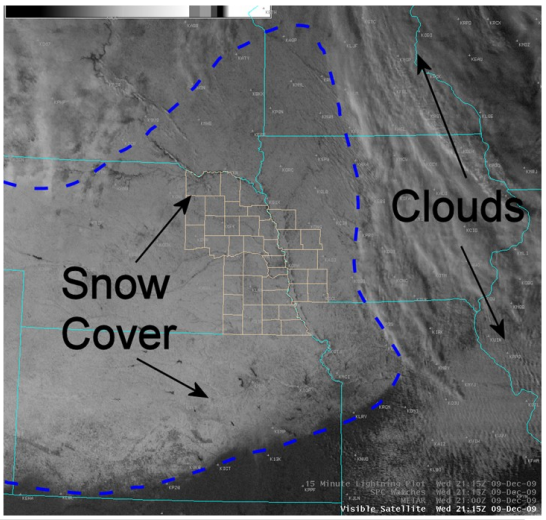
Considerable drifting snow also occurred, in many cases closing roads almost as fast as they could be opened by plows. This prompted many counties to pull snow plows off the roads for a while during the night of the 8th and early on the 9th. Many schools were closed for three days because of the storm: due the forecast of heavy snow to begin on the 7th, because of poor visibilities and roads that were drifted shut on the 8th, and with lingering closed roads and bitter cold wind chills which followed the storm on the 9th. An elderly Omaha man was found dead during the evening of the 8th when he apparently had car trouble and returned to his apartment, where was found sitting down in a chair outside.

Total snowfall from the storm was 6 to 15 inches over most of eastern Nebraska and western Iowa. Higher amounts in eastern Nebraska included 15 inches in Union, 14 inches in Columbus, and 12 to 13 inches at the NWS in Valley, Tekamah, Uehling, Steele City, Weeping Water, and Gretna. In western Iowa, heavier amounts included 14 inches in Clarinda, Hastings, and Red Oak, around 12 inches in Harlan, and around 11 inches near Little Sioux and Oakland.

The storm covered a very large area over the Plains, as can be seen by the visible satellite picture (right), laying down a foundation of snow cover that would persist over many locations into February 2010. The snow cover also aided in bringing periods of exceptionally cold temperatures and made future storms more efficient in producing blowing and drifting snow, closing roads and making travel difficult if not impossible.

(Left) Outside the NWS Valley office after the Dec. 7-9 snow storm.

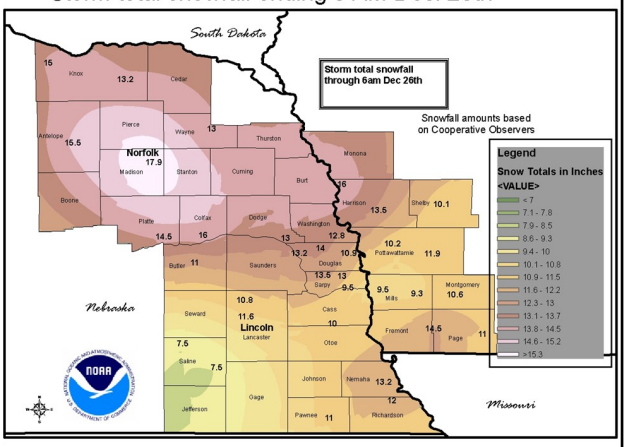
(Right) The storm covered a broad area of the Plains, as seen in this visible satellite picture taken on Dec. 9th, laying down a foundation of snow cover that would persist over many locations into February 2010.



A Winter to Remember, cont'd

Christmas 2009 blizzard: December 24-26, 2009

Storm total snowfall ending 6 AM Dec. 26th



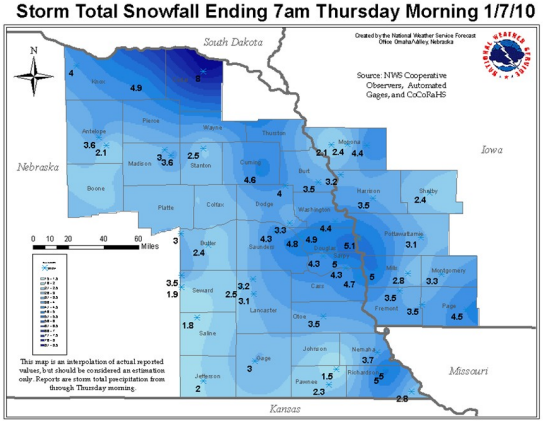
The second major winter storm of the month hit eastern Nebraska and southwest Iowa as a complex weather pattern brought a prolonged period of winter weather, including blizzard conditions, to the region around Christmas. Low pressure aloft in the Southern Plains lifted northeast into Missouri as another low pressure system dropped south out of Canada. These two systems then merged over the central United States and eventually pulled Atlantic moisture westward into the Plains. Before they merged, the southern system pulled up Gulf of Mexico moisture and brought areas of freezing rain to southeast Nebraska and 3 to 5 inches of snow to northeast Nebraska on the 23rd. The second system pulled down Arctic air as north winds gusted between 40 and 50 mph over most of the region. This not only changed all the precipitation to snow on the 24th, but also brought blizzard conditions to much of eastern Nebraska on Christmas Eve and much of Christmas Day. Snow and blowing snow and occasional blizzard or near-blizzard conditions then continued through much of the 26th.

Snowfall from the prolonged winter storm totaled 10 to 18 inches over most of eastern Nebraska and southwest Iowa. Heavier totals included around 18 inches in Norfolk, around 16 inches in Neligh and near Little Sioux, around 15 inches in Columbus, Verdel, and Shenandoah, 14 inches near Gretna, Bennington, and Logan, and 13 inches at the NWS in Valley, Auburn, Fremont, Ft. Calhoun, Wayne, Bloomfield, and Papillion. The snow and strong winds drifted most rural roads shut and even made many highways impassable, especially in northeast Nebraska and sections of southeast Nebraska where winds were a bit stronger.

One last winter storm: January 6, 2009

The third winter storm in a month hit eastern Nebraska and southwest Iowa was caused by an upper-level disturbance that dropped out of Canada and strengthened over the Central Plains before moving off to the east. This system pulled down Arctic air behind it and not only produced strong winds but also dangerously cold wind chill values. Even though snow amounts from this storm were about half as much or less than the storms that hit in December of 2009, and winds were similar or perhaps even a bit lighter, they lasted a relatively long time. Also, the snow from this storm fell on top of a base of older snow that already was around 10 to 20 inches deep over much of the area. Thus, substantial blowing and drifting snow was observed, with visibilities frequently 1 mile or less. In addition, the drifting snow from this storm was possibly worse than the prior two storms and many, if not most, rural roads became impassable for several days, as did many highways and interstates over the region. The task of snow removal was so daunting in some areas that the Department of Roads sent large rotary plows and other equipment from western Nebraska to help churn snow off the roads in eastern Nebraska. Many schools were closed for 3 days because of the snow and blowing snow at first, then because of the drifting snow and dangerously cold wind chills.

Storm Total Snowfall Ending 7am Thursday Morning 1/7/10



Snow totals were generally 3 to 6 inches from the storm, with 6 inches at Nebraska City, and with around 5 inches at the NWS office near Valley, Omaha Eppley, Shubert, and Papillion in Nebraska and at Clarinda and Glenwood in Iowa among the highest reported.

Flood Safety

by Bryon Miller, Meteorologist

More deaths occur due to flooding each year than from any other thunderstorm hazard. Many of these casualties are a result of careless or unsuspecting motorists who attempt to navigate flooded roads. The main reason is that people underestimate the force and power of water. Most cars will float and be swept away by 18-24 inches of moving water. Trucks and SUVs are only slightly better, with typically only 6-10 more inches of clearance. The National Weather Service now warns anyone who comes to a flooded roadway, "Turn around… don't drown!"

Terms To Know

Flash Flood or Flood Watch: Indicates flash flooding or flooding is possible within the designated watch area. When a watch is issued, be alert and ready to take action.
Flash Flood or Flood Warning: Flash flooding or flooding has been reported or is imminent. You should take necessary precautions and actions at once.

Follow these safety rules:

- If flooding occurs, get to higher ground. Stay away from flood-prone areas, including dips, low spots, valleys, ditches, washes, etc.
- Avoid flooded areas or those with rapid water flow. Do not attempt to cross a flowing stream. It takes only six inches of fast flowing water to sweep you off your feet.
- Don't allow children to play near high water, storm drains or ditches. Hidden dangers could lie beneath the water.
- Flooded roads could have significant damage hidden by floodwaters. NEVER drive through floodwaters or on flooded roads. If your vehicle stalls, leave it immediately and seek higher ground. Water only two feet deep can float away most automobiles.
- Do not camp or park your vehicle along streams and washes, particularly when threatening conditions exist.
- Be especially cautious at night when it is harder to recognize flood dangers.
- Monitor NOAA Weather Radio or your local media for vital weather related information.

A car is submerged in Nashville, Tennessee. Emergency officials in Tennessee sought help from the state's Army National Guard, and urged people to stay off roads and interstate highways turned into raging rivers. (AP Photo/The Tennessean, Shelley Mays)

Reporting Severe Weather

by Bryon Miller, Meteorologist

It is that time of the year again. As a reminder, here is how you should report severe weather:

Who? Who you are and whether or not you are a trained spotter.

What? Identify the type of severe weather you are reporting. This may be a tornado, a funnel cloud, hail at least 1 inch in diameter or larger, winds of at least 58 mph, wind damage, or flooding.

Where? Where the event took place. Use a direction and distance from a town if you are not in a town. You can also use intersections of major highways or GPS coordinates.

When? The time of the event, if not the current time. Try to report events as soon as they happen.

An example of a severe weather report might be:

"Hi, this is Bill Storm. I am a trained spotter and I want to report that 1 inch hail is falling in Ralston at the present time".

Severe Weather Terminology

by Bryon Miller, Meteorologist

A **Severe Thunderstorm Watch** means that weather conditions are favorable for the development of severe thunderstorms in and close to the watch area.

A **Tornado Watch** means that weather conditions are favorable for the development of tornadoes in and close to the watch area.

> When a watch is in effect, it means "Watch the Sky". Watches are issued for large areas (portions of states) and usually are in effect for 4 to 6 hours.

A **Severe Thunderstorm Warning** means that severe weather has been reported or has been indicated by radar.

A **Tornado Warning** means that a tornado has been sighted or has been indicated by radar.

> When a warning is in effect, it means "Take Cover". Warnings are issued for portions of counties and usually are in effect for 1 hour or less.

Severe thunderstorm - A thunderstorm with winds of 58 mph (50 knots) or more, or hail 1 inch in diameter or larger. Structural damage may imply the occurrence of a severe thunderstorm. Hail and wind are the two elements for classifying a thunderstorm as severe. Lightning and heavy rain are elements of the thunderstorm itself, but are not part of the criteria to determine a severe storm.

Tornado - A violently rotating column of air extending from the base of a cumuliform cloud that is in contact with the ground.

Enhanced Fujita Scale (or EF-Scale) - A scale of wind damage intensity in which wind speeds are inferred from an analysis of wind damage. All tornadoes, and most other severe local wind storms, are assigned a single number from the scale according to the most intense damage caused by the storm.

EF0 (weak): 65-85 mph, light damage

EF1 (weak): 86-110 mph, moderate damage

EF2 (strong): 111-135 mph, considerable damage

EF3 (strong): 136-165 mph, severe damage

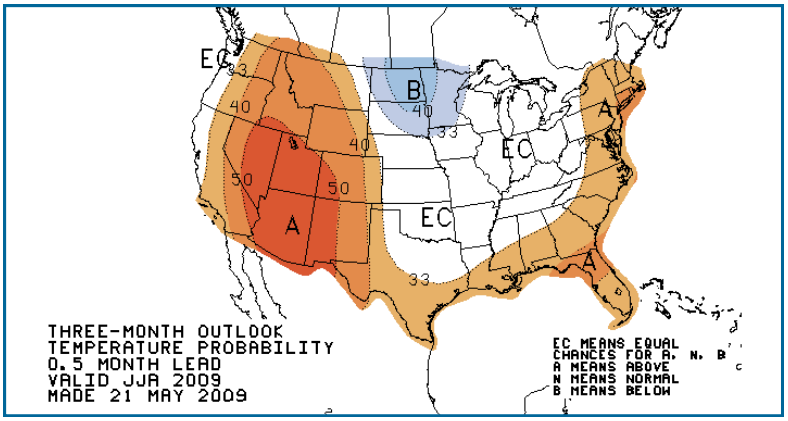
EF4 (violent): 166-200 mph, devastating damage

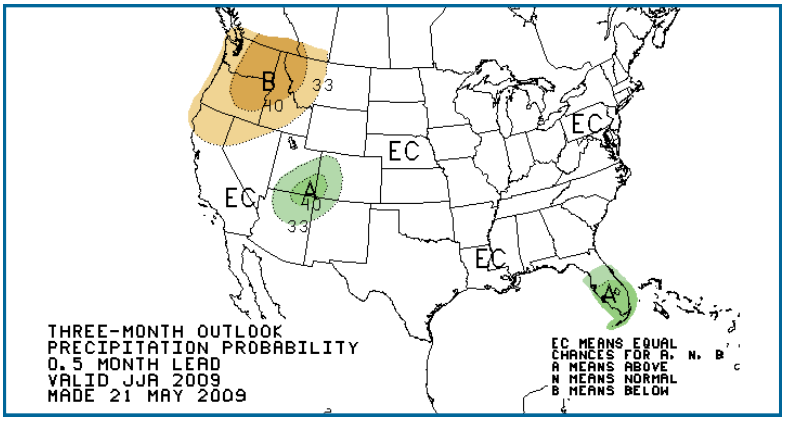
EF5 (violent): over 200 mph, (rare) incredible damage

Summer Outlook

by Barbara Mayes, Meteorologist

For the summer months (June through August), the National Weather Service's Climate Prediction Center is indicating a slightly higher than usual chance for temperatures to be in the coldest third compared to 1971-2000 records, as well as a slightly higher than usual chance for precipitation to fall in the wettest third compared to the same records (images to the right).

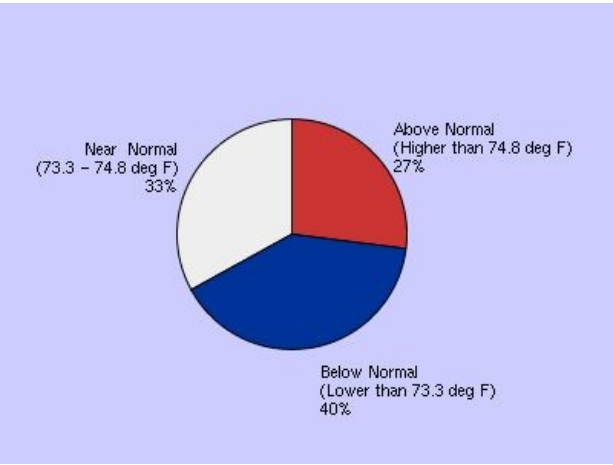




The "temperatures" that are forecast are an average of the daily highs and lows, which are then averaged over the entire 3-month period. The precipitation forecast accounts for all precipitation (rain and other liquid equivalent) for the entire 3-month period.

The National Weather Service also produces seasonal temperature forecasts for 10 points within eastern Nebraska and western Iowa. The forecast at one point, Omaha, is included for demonstration (image below). Like the forecast across the region, the Omaha outlook indicates a tilting of the odds toward a below normal summer. These forecasts are available at:

http://www.weather.gov/climate/calendar_outlook.php?wfo=oax



The current ocean temperatures in the Pacific Ocean near the equator are rapidly falling from above normal readings, after moderate to strong El Niño conditions persisted from last fall through the spring. The Climate Prediction Center is forecasting a return to ENSO-neutral conditions by June as sea-surface temperatures return to near-normal readings. The potential for a La Niña to develop by late fall is also increasing, with more climate models indicating cooling temperatures in the Pacific Ocean near the equator. Temperature and precipitation forecasts made by the Climate Prediction Center often include the affects of a La Niña or an El Niño.

Cooperative Observer s Provide Important Information!

by Terry Landsvork, Observation Program Leader

Did you know that climatological normals for most of the counties in every state in this country are established from the data reported by the more than 10,000 volunteers that make up the Cooperative Observer Program? The data provided by daily reports from cooperative observer stations scattered across this country account for the bulk of the climatological data sets that establish average high and low temperatures, rainfall, and snowfall for thousands of locations from cities to rural areas.

The winter of 2009-2010 certainly pointed out the importance of these daily observations. Snowfall for eastern Nebraska and southwest Iowa was above normal for the period of October 2009 through March 2010. In December alone, many records were obliterated when two blizzard-like events, in addition to lighter snow from three other weather systems, impacted the Central Plains. The 24.6 inches of snow at Eppley Airfield in Omaha was the snowiest December on record for the Omaha metro area since 1884 and easily surpassed the previous record of 19.9" in 1969. The new record at Omaha is certainly noteworthy, but taken alone it does not begin to paint a picture of how much snow actually fell across eastern Nebraska and southwest Iowa.

December totals from cooperative sites from eastern Nebraska included Auburn with 30.1", Bennington 31.2", Gretna 31.5", Howells 24.8", Humphrey 39.7", Lincoln 26.3", Malcolm 32.5", Plattsmouth 22.6", Schuyler 30.1", Springfield 24.2", Tecumseh 30.0", and Walthill 30.5". In southwest Iowa, Clarinda reported 30.0", Glenwood 22.5", Little Sioux 33.5", Oakland 29.0", Red Oak 27.8", Shenandoah 31.2", and Underwood 30.8". It should be easy to see that within 40 miles of Omaha, many snow totals were quite a bit higher than the observation at Omaha Eppley. Without the daily reports from these trained volunteers in surrounding towns, the data used to compute monthly snowfall averages for much of eastern Nebraska and southwest Iowa would have been significantly lower.

The heavy snow and tremendous drifts resulting from last winter's storms overwhelmed snow removal budgets for most of the counties in eastern Nebraska and southwest Iowa. As a result, county emergency managers were tasked with requesting emergency funds from the Federal Emergency Management Agency (FEMA) to pay for cost overages. The cooperative weather reports became the basis for which counties would qualify for millions of dollars of relief aid. FEMA has very objective rules on what qualifies for these funds. Generally speaking, a county qualified for assistance if observed snowfall reached a certain percentage beyond what is established as normal monthly snowfall. Many counties did not qualify during this period.

Snow plows work on Interstate 80, west of Omaha on Tuesday, Dec. 8, 2009. (AP Photo/Nati Harnik)

Climatological and Astronomical Data

Compiled by Steve Klemm, Hydro-Meteorological Technician

Climatological Data for January through April 2010

Location	Month	Average	Departure	Rain / Snow	Departure	Highest	Lowest
Omaha	Jan	16.7°	-5.0°	1.12" / 10.4"	+0.35"	43° (23rd)	-20° (4th)
	Feb	20.7°	-7.3°	0.70" / 8.1"	-0.10"	37° (18th)	-6° (24th)
	Mar	40.8°	+1.5°	1.72" / 0.8"	-0.41"	80° (31st)	11° (3rd)
	Apr	57.3°	+5.9°	3.01" /0"	+0.07"	87° (1st)	29° (8th)
Lincoln	Jan	18.0°	-4.4°	0.82" / 7.1"	+0.15"	43° (23rd)	-15° (4th)
	Feb	22.6°	-5.7°	0.99" / 7.4"	+0.33"	42° (3rd)	-2° (10th)
	Mar	41.0°	+1.6°	1.77" / 1.6"	-0.44"	78° (31st)	15° (2nd, 21st)
	Apr	55.6°	+4.4°	2.53" / 0"	-0.37"	85° (1st)	25° (8th)
Norfolk	Jan	16.5°	-3.9°	0.78" / 9.2"	+0.21"	41° (10th)	-19° (9th)
	Feb	19.6°	-6.8°	0.93" / 10.5"	+0.17"	35° (4th, 7th)	-3° (9th, 24th)
	Mar	39.4°	+2.4°	0.90" / 0.3"	-1.07"	78° (30th)	11° (2nd)
	Apr	54.0°	+4.9°	1.70" / 0"	-0.89"	85° (12th)	25° (8th)

Normal High/Low Temperatures

Location	Jun 1	Jul 1	Aug 1	Sep 1
Omaha	80/56	87/64	87/66	82/59
Lincoln	80/56	88/64	89/66	83/59
Norfolk	78/54	85/61	86/64	81/56

Outlook for June, July, and August

The outlook for June, July, and August calls for a higher than usual chance for below normal temperatures and above normal precipitation. For additional details and other outlook information, please visit the Climate Prediction Center website at http://www.cpc.ncep.noaa.gov/

Sunrise/Sunset (http://aa.usno.navy.mil/data/docs/RS_OneYear.html)

	Omaha		Lincoln		Norfolk	
Date	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset
Jun 1	5:53 am CDT	8:50 pm CDT	5:58 am CDT	8:52 pm CDT	5:57 am CDT	8:58 pm CDT
Jul 1	5:54 am CDT	9:01 pm CDT	5:59 am CDT	9:02 pm CDT	5:58 am CDT	9:09 pm CDT
Aug 1	6:18 am CDT	8:41 pm CDT	6:23 am CDT	8:43 pm CDT	6:23 am CDT	8:49 pm CDT
Sep 1	6:49 am CDT	7:57 pm CDT	6:53 am CDT	8:00 pm CDT	6:55 am CDT	8:04 pm CDT

Times are given in CDT (Central Daylight Time).

Moon Phases

New Moon	First Quarter	Full Moon	Last Quarter
May 13	May 20	May 27	Jun 04
Jun 12	Jun 18	Jun 26	Jul 04
Jul 11	Jul 18	Jul 25	Aug 02
Aug 09	Aug 16	Ayg 24	Sep 01

Summer Solstice (Start of Summer): June 21st, 2010, at 6:28 am CDT